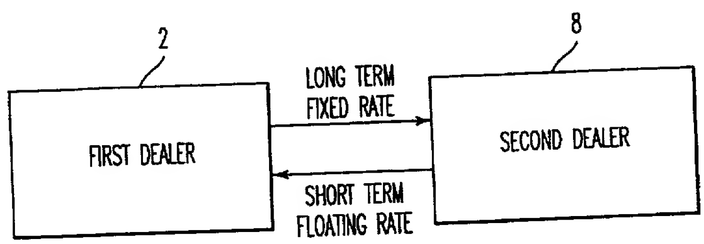


FIG. 1
PRIOR ART

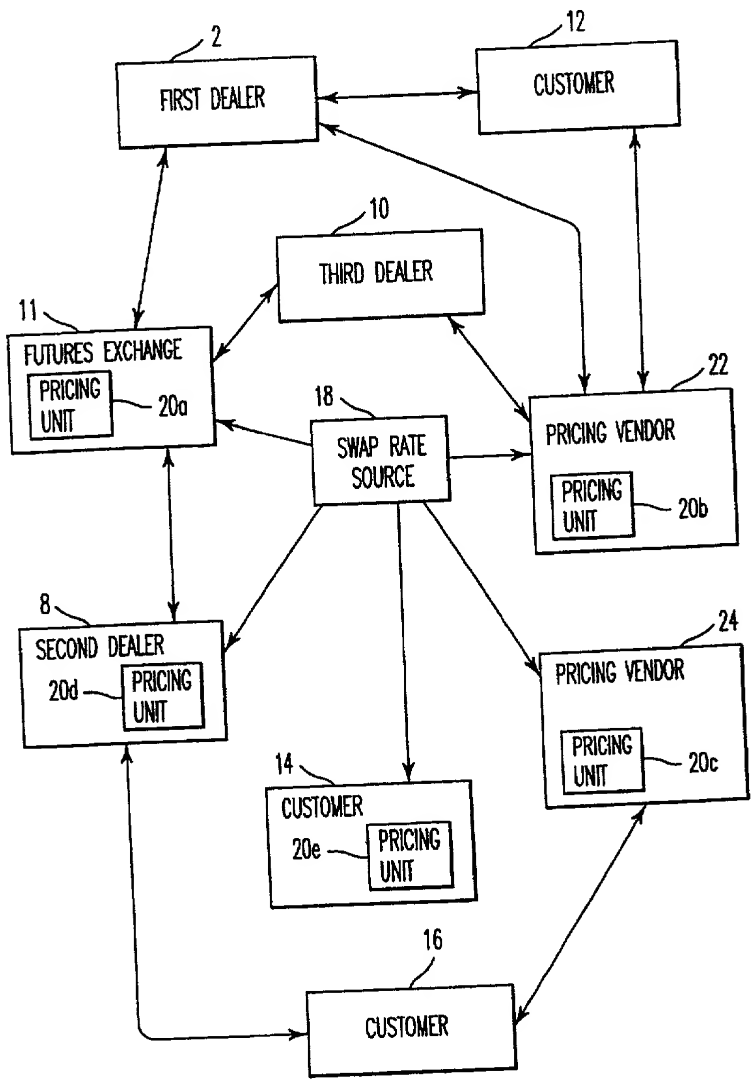

2
FIRST DEALER
12
CUSTOMER
10
THIRD DEALER
11
FUTURES EXCHANGE
PRICING UNIT
20a
18
SWAP RATE SOURCE
22
PRICING VENDOR
PRICING UNIT
20b
8
SECOND DEALER
20d
PRICING UNIT
24
PRICING VENDOR
PRICING UNIT
20c
14
CUSTOMER
20e
PRICING UNIT
16
CUSTOMER

FIG. 2

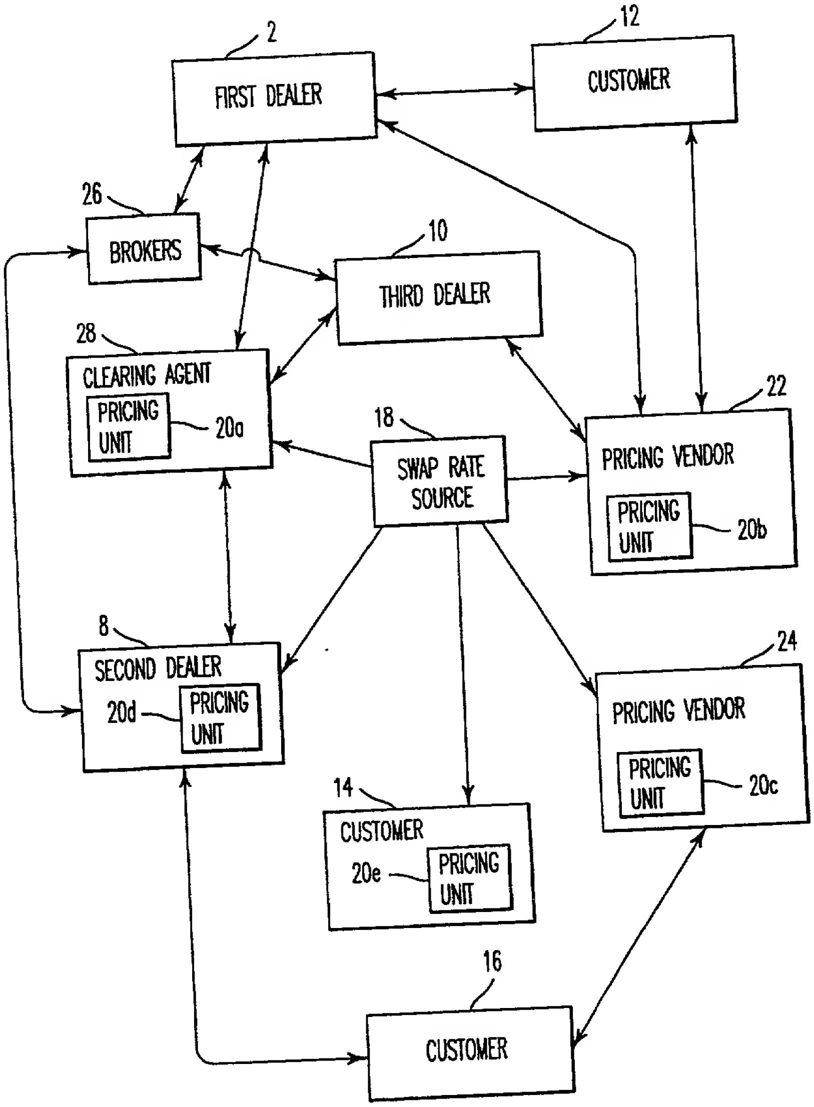

FIRST DEALER
2
CUSTOMER
12
BROKERS
26
THIRD DEALER
10
CLEARING AGENT
28
PRICING UNIT
20a
SWAP RATE SOURCE
18
PRICING VENDOR
22
PRICING UNIT
20b
SECOND DEALER
8
20d
PRICING UNIT
PRICING VENDOR
24
PRICING UNIT
20c
CUSTOMER
14
20e
PRICING UNIT
CUSTOMER
16

FIG. 3

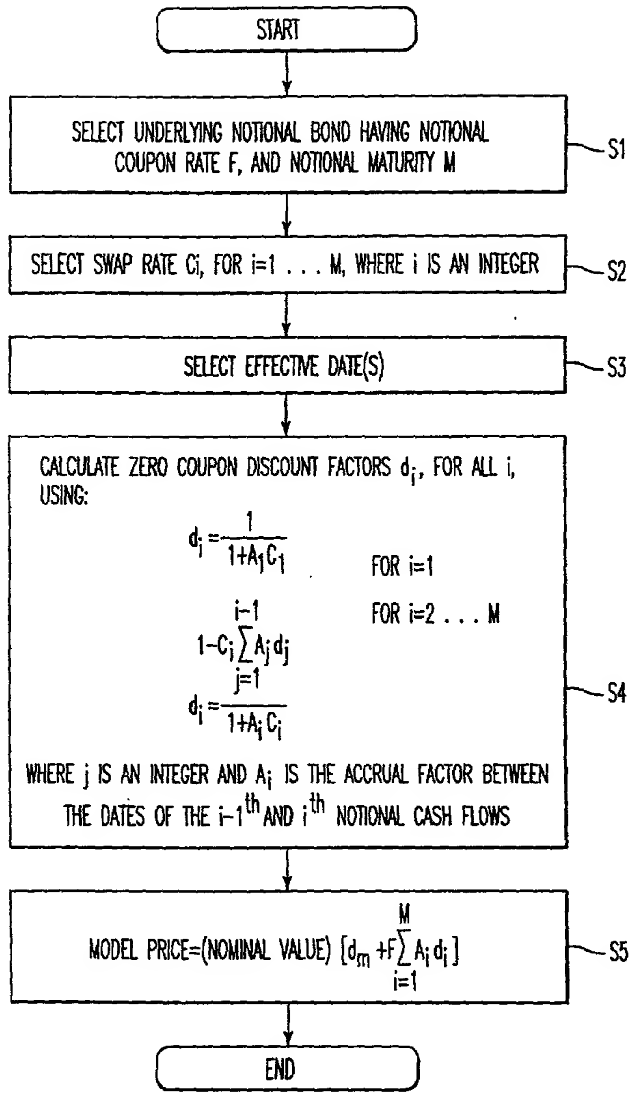
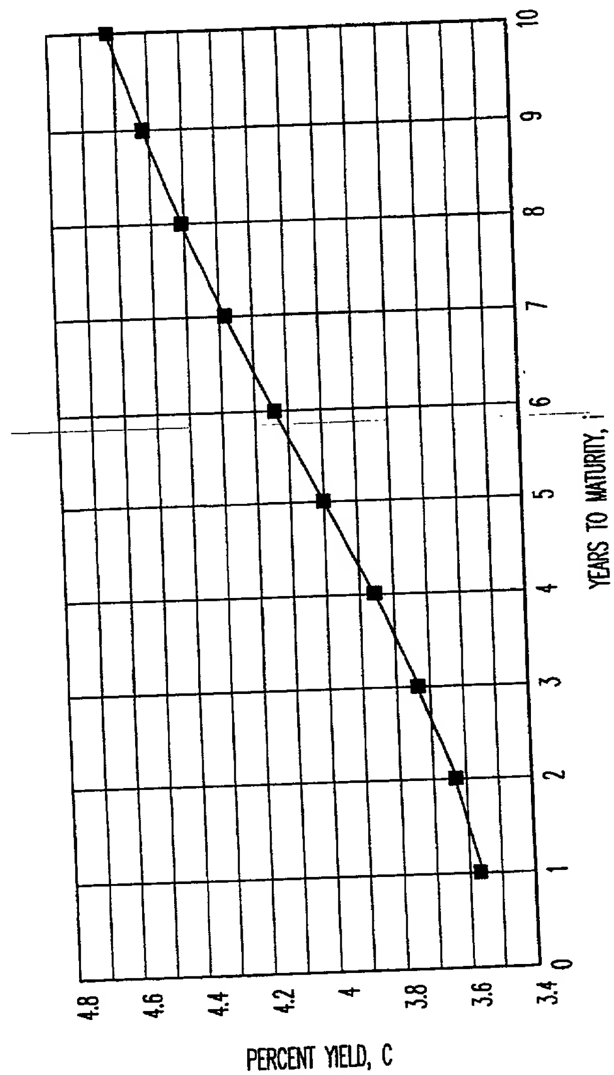

START
SELECT UNDERLYING NOTIONAL BOND HAVING NOTIONAL COUPON RATE F, AND NOTIONAL MATURITY M
S1
SELECT SWAP RATE Ci, FOR i=1 . . . M, WHERE i IS AN INTEGER
S2
SELECT EFFECTIVE DATE(S)
S3
CALCULATE ZERO COUPON DISCOUNT FACTORS d_i, FOR ALL i, USING:
$d_i = \frac{1}{1+A_1C_1}$ FOR i=1
$d_i = \frac{1-C_i\sum_{j=1}^{i-1} A_j d_j}{1+A_i C_i}$ FOR i=2 . . . M
WHERE j IS AN INTEGER AND A_i IS THE ACCRUAL FACTOR BETWEEN THE DATES OF THE $i-1^{th}$ AND i^{th} NOTIONAL CASH FLOWS
S4
MODEL PRICE=(NOMINAL VALUE) $[d_m + F\sum_{i=1}^{M} A_i d_i]$
S5
END

FIG. 4A



PERCENT YIELD, C
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
YEARS TO MATURITY, i
0
1
2
3
4
5
6
7
8
9
10

FIG. 4B

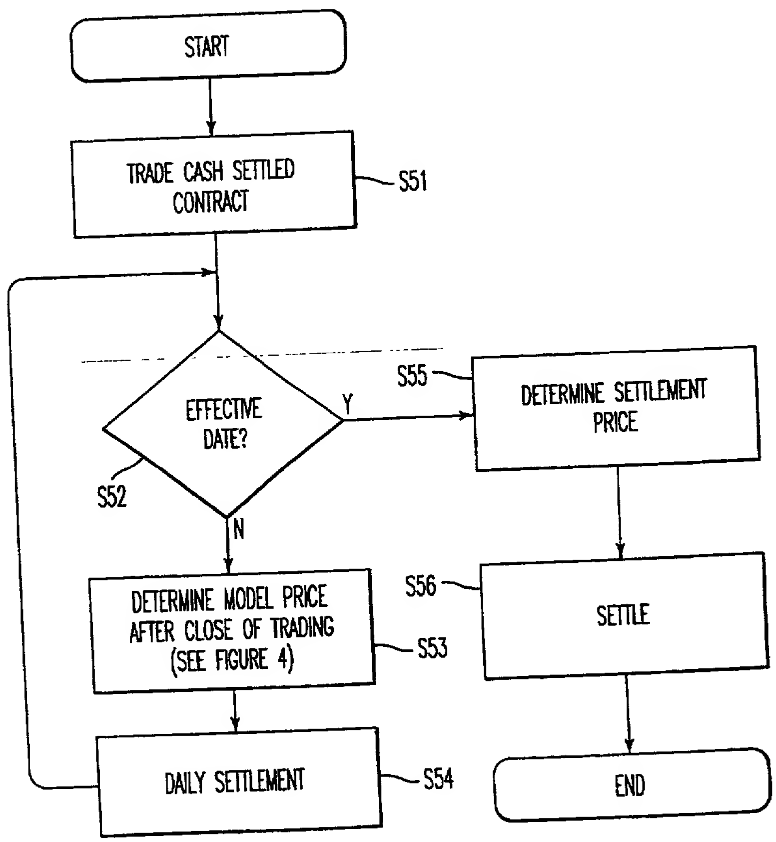

START
TRADE CASH SETTLED CONTRACT
S51
EFFECTIVE DATE?
S52
Y
N
S55
DETERMINE SETTLEMENT PRICE
DETERMINE MODEL PRICE AFTER CLOSE OF TRADING (SEE FIGURE 4)
S53
S56
SETTLE
DAILY SETTLEMENT
S54
END

FIG. 5A

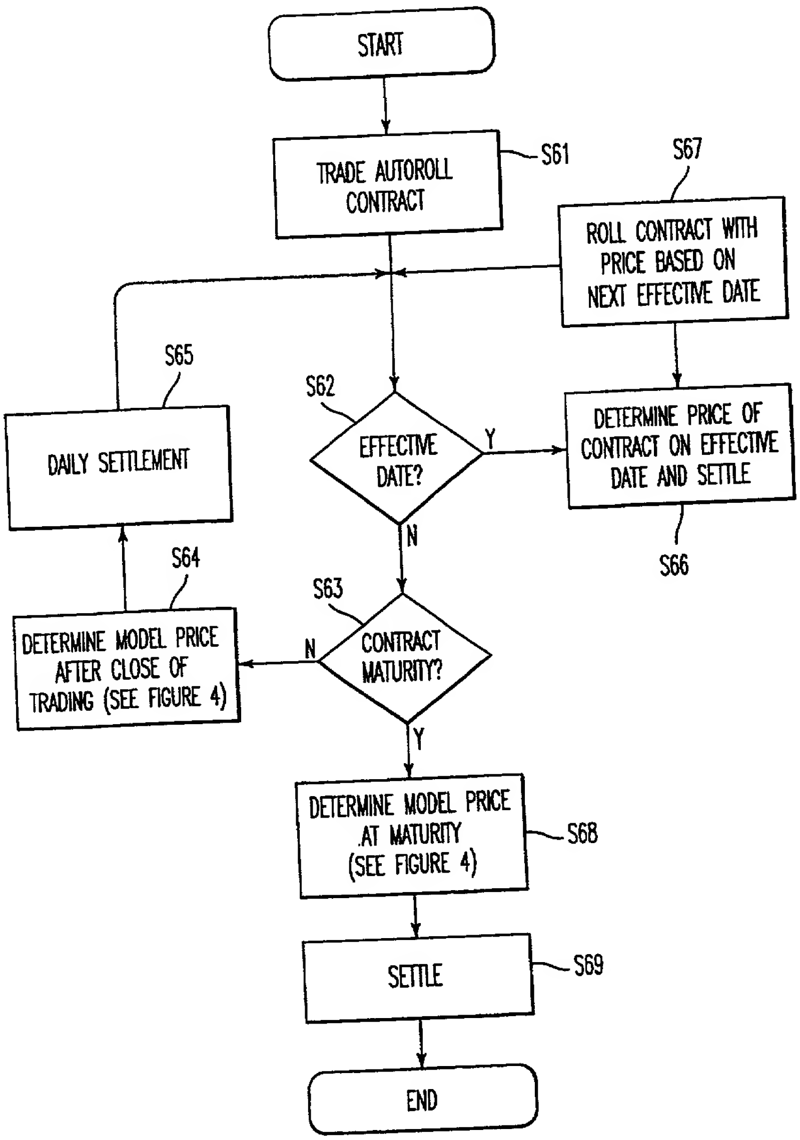

START
TRADE AUTOROLL CONTRACT
S61
S67
ROLL CONTRACT WITH PRICE BASED ON NEXT EFFECTIVE DATE
S65
S62
DAILY SETTLEMENT
EFFECTIVE DATE?
Y
DETERMINE PRICE OF CONTRACT ON EFFECTIVE DATE AND SETTLE
N
S64
S66
S63
DETERMINE MODEL PRICE AFTER CLOSE OF TRADING (SEE FIGURE 4)
N
CONTRACT MATURITY?
Y
DETERMINE MODEL PRICE AT MATURITY (SEE FIGURE 4)
S68
SETTLE
S69
END

FIG. 5B

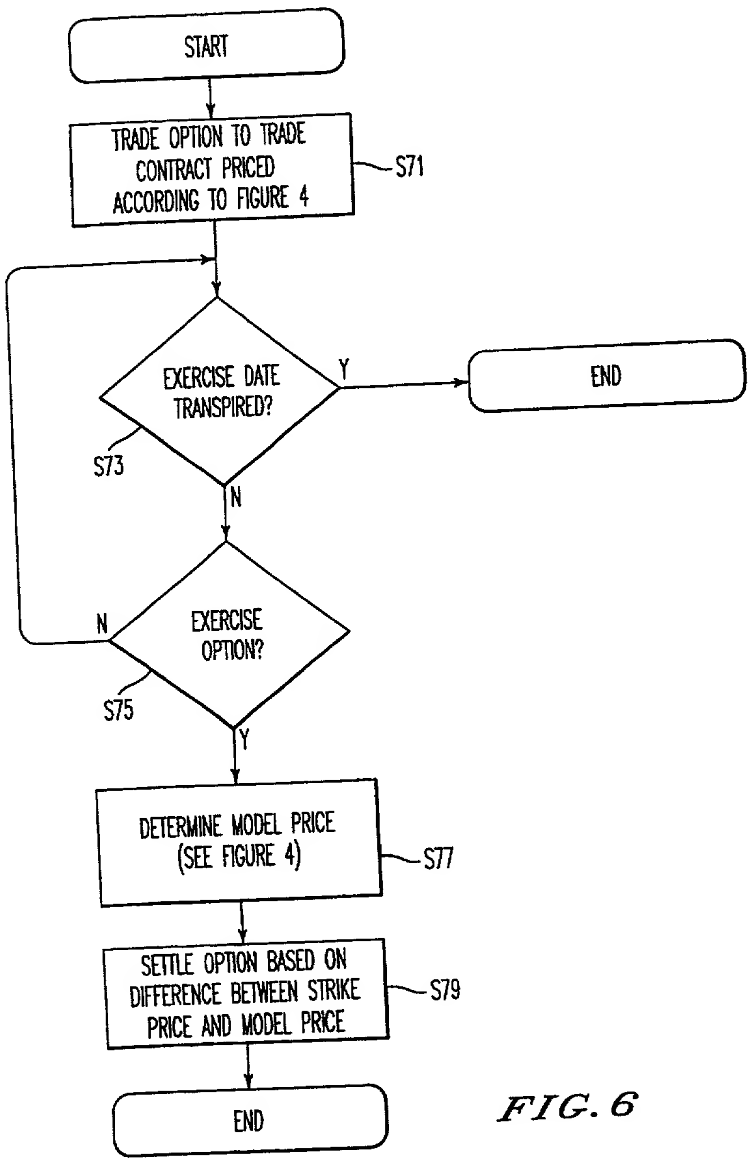

START
TRADE OPTION TO TRADE CONTRACT PRICED ACCORDING TO FIGURE 4
S71
EXERCISE DATE TRANSPIRED?
S73
Y
END
N
EXERCISE OPTION?
N
S75
Y
DETERMINE MODEL PRICE (SEE FIGURE 4)
S77
SETTLE OPTION BASED ON DIFFERENCE BETWEEN STRIKE PRICE AND MODEL PRICE
S79
END

FIG. 6

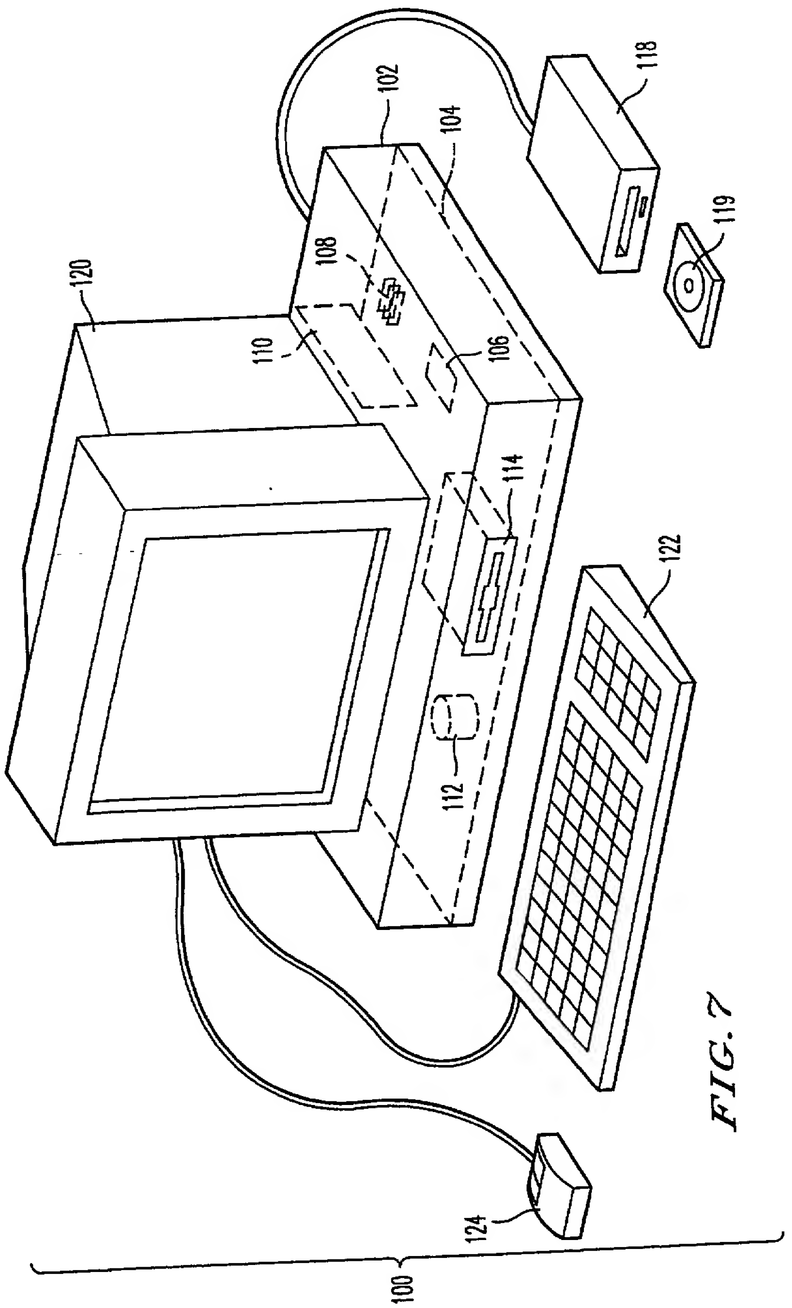


FIG. 7

	A	B	C	D
	INPUTS			
1	(Alter Blue Figures in Green Background/DropDown Lists Only)			
2				
3				
4	Swap Rates (taken on Last Trading Day)			
5	Swaps (Fixed Side) Daycount	360		
6	Swap Settlement Delay (Days)	2		
7	Libor Daycount	360		
8	Last Trading Day	14-Dec-98		
9				
10	Type	Source	Term	Rate
11			Months	
12	Zero Coupon	LIBOR	1	3.457
13	Zero Coupon	LIBOR	3	3.469
14	Zero Coupon	LIBOR	6	3.469
15	Zero Coupon	LIBOR	9	3.531
16			Years	
17	Fixed Income	IRS mkt	1	3.570
18	Fixed Income	IRS mkt	2	3.628
19	Fixed Income	IRS mkt	3	3.731
20	Fixed Income	IRS mkt	4	3.860
21	Fixed Income	IRS mkt	5	4.000
22	Fixed Income	IRS mkt	6	4.139
23	Fixed Income	IRS mkt	7	4.276
24	Fixed Income	IRS mkt	8	4.409
25	Fixed Income	IRS mkt	9	4.522
26	Fixed Income	IRS mkt	10	4.621

Notional Cash Flows	
Notional Coupon	6
Start Date	16-Dec-98
Initial Maturity	10
End Date	16-Dec-08

Delivery Month Details		
Expiring Front Month	Effective Date	Remaining Maturity
Dec-98 ▽	16-Dec-98	10
Back Month	Effective Date	
Mar-99	17-Mar-99	9 3/4

J	K
OUTPUTS	
Front Month	
Effective Date	16-Dec-98
EDSP	111.03
Back Month	
Effective Date	17-Mar-99
Fair Value (as of Front Month Effective Date)	110.49
Calendar Roll	
Calendar Roll (price basis points)	54

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FIG. 8

	A	B	C	D	E	F	G	H	I	J
1	Source	Term	Maturity of par swap	Day	Rate	"Following" Maturity	Day of "Following" Maturity	Accrual Factor		Zero Coupon Discount Factor (term from Front Month Effective Date)
2		Year(s)	16-Dec-98	Wednesday		16-Dec-98	Wednesday			1.000000
3	BBA LIBOR	1/12	16-Jan-99	Saturday	3.457	18-Jan-99	Monday	0.091666667		0.996841
4	BBA LIBOR	1/4	16-Mar-99	Tuesday	3.469	16-Mar-99	Tuesday	0.25		0.991403
5	BBA LIBOR	1/2	16-Jun-99	Wednesday	3.469	16-Jun-99	Wednesday	0.505555556		0.982766
6	BBA LIBOR	3/4	16-Sep-99	Thursday	3.531	16-Sep-99	Thursday	0.761111111		0.973827
7	IRS mkt	1	16-Dec-99	Thursday	3.570	16-Dec-99	Thursday	1.000	0.965531	0.965531
8	IRS mkt	2	16-Dec-00	Saturday	3.628	18-Dec-00	Monday	1.006	0.936178	0.9310060
9	IRS mkt	3	16-Dec-01	Sunday	3.731	17-Dec-01	Monday	0.997	0.893233	0.8957207
10	IRS mkt	4	16-Dec-02	Monday	3.860	16-Dec-02	Monday	0.997	0.856662	0.8590481
11	IRS mkt	5	16-Dec-03	Tuesday	4.000	16-Dec-03	Tuesday	1.000	0.821092	0.8210922
12	IRS mkt	6	16-Dec-04	Thursday	4.139	16-Dec-04	Thursday	1.000	0.782488	0.7824880
13	IRS mkt	7	16-Dec-05	Friday	4.276	16-Dec-05	Friday	1.000	0.743496	0.7434964
14	IRS mkt	8	16-Dec-06	Saturday	4.409	18-Dec-06	Monday	1.006	0.708206	0.7042934
15	IRS mkt	9	16-Dec-07	Sunday	4.522	17-Dec-07	Monday	0.997	0.664801	0.6666523
16	IRS mkt	10	16-Dec-08	Tuesday	4.621	16-Dec-08	Tuesday	0.997	0.628558	0.6303087

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FIG. 9

	A	B	C	D	E	F
1						
2						
3	Cash flow (in years from Start day)	Notional Cash Flow (CF) Dates	"Following" Cash Flow Dates	Accrual Factor (30E/360)	Notional Cash Flow	Adjusted Cash Flow
4	Start Date	16-Dec-98	16-Dec-98			
5	1	16-Dec-99	16-Dec-99	.1000	6	6
6	2	16-Dec-00	18-Dec-00	1.006	6	6.033333333
7	3	16-Dec-01	17-Dec-01	0.997	6	5.983333333
8	4	16-Dec-02	16-Dec-02	0.997	6	5.983333333
9	5	16-Dec-03	16-Dec-03	1.000	6	6
10	6	16-Dec-04	16-Dec-04	1.000	6	6
11	7	16-Dec-05	16-Dec-05	1.000	6	6
12	8	16-Dec-06	18-Dec-06	1.006	6	6.033333333
13	9	16-Dec-07	17-Dec-07	0.997	6	5.983333333
14	10	16-Dec-08	16-Dec-08	0.997	106	105.9833333

FIG. 10A

G	H	I	J	K	L
Discount Factor (From Front Effective Date)	PV (Front Effective Date) of Adj Cash Flows	PV (Front Effective Date) of Cash Flows After front Month	PV (Back Effective Date) of Cash Flows After Back Month	AI at Front Month Effective Date	AI at Back Month Effective Date
				0	1.516666667
0.966	5.793	5.793183354	5.843974503	0	0
0.931	5.617	5.617069558	5.666316647	0	0
0.896	5.359	5.35939573	5.40638369	0	0
0.859	5.140	5.139971205	5.185035383	0	0
0.821	4.927	4.926553083	4.969746138	0	0
0.782	4.695	4.694927743	4.736090047	0	0
0.743	4.461	4.460978687	4.500089866	0	0
0.704	4.249	4.249236816	4.28649157	0	0
0.667	3.989	3.988803133	4.023774456	0	0
0.630	66.802	66.80221772	67.3878994		

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FIG. 10B

FIG.11A	FIG.11B
FIG.11C	FIG.11D

FIG. 11

T02080" 68T28960

Today	12/11/98							
Swap/Libor Delay (days)	2							
Swap/Libor Settle	12/15/98							
Delivery Day	12/16/98							
Last Trading Day	12/14/98							
Notional Coupon	6							
LPB Maturity	10			Implied Futures Price (IPF) Calculator-alter blue figures/drop-down box only				
Interpolation	2					Outputs		
			Dirty Price (present value) as of trade date	Implied Futures Price (IFP)	Implied Financing rate	Implied YTM/par swap rate at Expiry	Implied spot YTM	Delta Vector (Change in IFP)
			101.54	101.56	3.46%	4.801%	4.801%	8.0161
		Rates to	Discount Factors					
Source	Nominal term (years)	DM Swap/Libor Rate	"Following" Maturity of depo/par swap	Accrual Factor	Zero Coupon discount factors	Par swap sensitivity	Number of notional cashflow	"Following" notional cashflow date
	0		12/15/98		1.000000		0	12/16/98
Libor	0.08333	3.470	1/15/99	0.086111	0.997021		1	12/16/99
Libor	0.25	3.520	3/15/99	0.250000	0.991277		2	12/18/00
Libor	0.5	3.590	6/15/99	0.505556	0.982174		3	12/17/01
Libor	0.75	3.590	9/15/99	0.761111	0.973403		4	12/16/02
IRS market	1	3.635	12/15/99	1.000000	0.964925	0.9649	5	12/16/03

FIG. 11A

IFP Sensitivity to 1 basis point implied yield shift	Dirty Price sensitivity to 1 basis point spot YTM shift										
7.8726	7.8746										
Notional Cash Flows				Curve Adjustment							
Accrual Factor	Adjusted notional coupon/principal	PV of cash flow	(Delta Vector) Kick points on par curve by the following								
			(basis points)	1		1					
1.000000	5.00000	4.824127	0	0.997021	4.823660	0.997021	4.824594				
1.005556	5.02778	4.670045	0	0.991277	4.669141	0.991277	4.670950				
0.997222	4.98611	4.446208	0	0.982174	4.444920	0.982174	4.447497				
1.000000	4.98611	4.252615	0	0.973403	4.066833	0.973403	4.254258				
1.000000	5.00000	4.068797	1	0.964832	3.870655	0.965018	4.070764				

FIG. 11B

IRS market	2	3.740	12/15/00	1.000000	0.929161		6	12/16/04
IRS market	3	3.880	12/17/01	1.005556	0.891719		7	12/16/05
IRS market	4	4.040	12/16/02	0.997222	0.852892	3.6413	8	12/18/06
IRS market	5	4.180	12/15/03	0.997222	0.813869	4.4529	9	12/17/07
IRS market	6	4.310	12/15/04	1.000000	0.774691	5.2276	10	12/16/08
IRS market	7	4.440	12/15/05	1.000000	0.735250	5.9628		
IRS market	8	4.560	12/15/06	1.000000	0.696342	6.6592		
IRS market	9	4.650	12/17/07	1.005556	0.659511	7.3223		
IRS market	10	4.804	12/15/08	0.994444	0.618678	7.9376		
Linear Interpolation	11	4.849	12/15/09	1.000000	0.586643	8.5242		
Linear Interpolation	12	4.894	12/15/10	1.000000	0.555597	9.0798		
Linear Interpolation	13	4.940	12/15/11	1.000000	0.525534	9.6054		
Linear Interpolatio	14	4.985	12/17/12	1.005556	0.496314	10.1044		
IRS market	15	5.030	12/16/13	0.997222	0.468259	10.5714		

FIG. 11C

1.000000	5.00000	3.872902	1	0.928982	3.870655	0.929340	3.875150
1.000000	5.00000	3.675704	1	0.891460	3.673211	0.891977	3.678189
1.005556	5.02778	3.499496	1	0.852563	3.496776	0.853222	3.502219
0.997222	4.98611	3.288394	1	0.813476	3.285515	0.814262	3.291276
0.997222	104.98611	64.943158	1	0.774242	64.879642	0.775141	65.006742
			1	0.734752		0.735749	
			1	0.695801		0.696883	
			1	0.658933		0.660089	
			1	0.618073		0.619284	
			1	0.586012		0.587275	
			1	0.554944		0.556250	
			1	0.524864		0.526204	
			1	0.495632		0.496998	
			1	0.467567		0.468952	

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FIG. 11D